



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

location 4760
DAC/JP

Applicant: Graham R. Matthews et al.

Title: SYSTEM AND PROTOCOL FOR FRAME RELAY SERVICE OVER THE INTERNET

Docket No.: 1384.004US3

Filed: February 04, 2002

Examiner: Unknown

Serial No.: 10/067,106 ✓

Due Date: May 21, 2003

Group Art Unit: 2152

Mail Stop Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

We are transmitting herewith the attached:

- ☒ A return postcard.
- ☒ A copy of the Decision on Petition date October 21, 2002 (3 pgs)
- ☒ Petition for Extension of Time (1 pg)
- ☒ Communication Re: Decision on Petition (1 pg)
- ☒ A Combined Declaration and Power of Attorney (12 pgs)
- ☒ Pages from <http://fedex.com/us/> confirming the delivery of the signature papers and Application to Sajit Bhaskaran, 1336 Avoset Terrace, Sunnyvale, CA 94087 (4 pgs)
- ☒ A copy of the signature papers and Application as mentioned above; including a copy of an email which was sent to Sajit Bhaskaran earlier (sajit@aspen-networks.com) (40 pgs)
- ☒ A reply, via email, from Sajit Bhaskaran (sajit@aspen-networks.com) explicitly requesting to be removed from the list of inventors (2 pgs)
- ☒ A check in the amount of \$985.00 to cover the Extension of Time Fee.

If not provided for in a separate paper filed herewith, please consider this a PETITION FOR EXTENSION OF TIME for sufficient number of months to enter these papers and please charge any additional required fees or credit overpayment to Deposit Account No. 19-0743.

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
P.O. Box 2938, Minneapolis, MN 55402 (612) 373-6909

By: Thomas F. Brennan
Name: Thomas F. Brennan
Reg. No. 35,075
TFB:CMG:jds

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Attn: Mail Stop Petition, Commissioner for Patents, P.O.Box 1450, Alexandria, VA 22313-1450, on this 21 day of May, 2003

JASON D. SMITH
Name

[Signature]
Signature

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Paper No. 4

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OCT 21 2002

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

In re Application of
Matthews, et al.
Application No. 10/067,106
Filed: February 4, 2002
Atty. Dkt. No.: 1384.004US3
Title: SYSTEM AND PROTOCOL FOR
FRAME RELAY SERVICE OVER THE
INTERNET

:
:
: DECISION REFUSING
: STATUS UNDER 37 CFR
: 1.47(a)
:
:

OFFICE OF PETITIONS

This decision is in response to the petition under 37 CFR 1.47(a), filed September 16, 2002.

The petition is **DISMISSED**.

Dec. 21, 2002

Rule 47 applicant is given TWO MONTHS from the mailing date of this decision to reply, correcting the below-noted deficiencies. Any reply should be entitled "Request for Reconsideration of Petition Under 37 CFR 1.47(a)," and should only address the deficiencies noted below, except that the reply may include an oath or declaration executed by the non-signing inventor. Failure to respond will result in abandonment of the application. Any extensions of time will be governed by 37 CFR 1.136(a).

The above-identified application was filed February 4, 2002 without an executed oath or declaration. Accordingly, a Notice to File Missing parts of Nonprovisional Application was mailed April 9, 2002 requiring, among other items, an executed oath or declaration and a surcharge. The instant petition naming Abraham R. Matthews, Sajit Bhaskaran, Lianghwa Jou, and Sachin Desai as joint inventors was filed in response.

A grantable petition under 37 CFR 1.47(a) requires: (1) proof that the non-signing inventor cannot be reached or refuses to sign the oath or declaration after having been presented with the application papers (specification, claims and drawings); (2) an acceptable oath or declaration in compliance with 35 U.S.C. §§ 115 and 116; (3) the petition fee; and (4) a statement of the last known address of the non-signing inventor.

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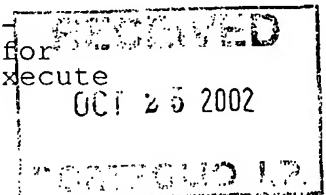
MAY 30 2003

The instant petition lacks items (1) and (2) set forth above.

OFFICE OF PETITIONS

As to item (1), petitioner has failed to establish that the inventor received the application papers (specification, claims, drawings, and oath or declaration) and thereafter refused to execute the oath or declaration.

The affidavit of Rodney L. Lacy indicates that the non-signing inventor was sent a copy of the patent papers for application No. 09/663,486 and thereafter refused to execute the declaration application No. 09/663,486.



FIP

Application No. 10/067,106

Petitioner is reminded that before a refusal to sign an oath or declaration can be alleged, it must be demonstrated that a *bona fide* effort has been made to present a copy of the application papers (specification, including claims, drawings, and oath or declaration) to the non-signing inventor. Petitioner has presented no evidence that the non-signing inventor was ever presented with a copy of the application papers (specification, claims, drawings, oath or declaration) for the instant application. While the affidavit of Rodney L. Lacy references a written refusal to execute a declaration in a prior application, there is no indication that the inventor ever received the application papers for the instant application and thereafter refused to execute the declaration.

Any renewed petition should be accompanied by evidence to sufficiently establish that the non-signing inventor either cannot be located or that the non-signing inventor was sent a complete copy of the application papers and thereafter refused to execute the declaration. A copy of the application papers should be sent to the last known address of the non-signing inventor, or, if the non-signing inventor is represented by counsel, to the address of the non-signing inventor's attorney. Petitioner may wish to provide the Office copies of letters sent to the inventor indicating the enclosure of the application papers (specification, claims, drawings, and oath or declaration). If after the inventor receives the application papers and requests to execute the oath or declaration are refused, these facts should be set forth in a statement of facts signed by the person to whom the refusals were made and detailing with specificity the exact manner of the refusals. If a written refusal has been made, a copy of the written refusal should be included on renewed petition.

However, petitioner is advised that if Rule 47 status has been accorded in a prior application in a previous decision on petition, petitioner may submit a copy of the decision upon renewed petition in accordance with 37 CFR 1.47(c).

As to item (2), the declaration is unacceptable as the citizenship the non-signing inventor is contrary to the citizenship claimed by the inventor in the copy of the E-mail referenced in and attached to the petition. Whereas the inventor claims to be of Singapore citizenship, the declaration indicates the inventor is of United States citizenship. Any renewed petition should include an oath or declaration in compliance with 37 CFR 1.63 and 37 CFR 1.64.

Further correspondence with respect to this matter should be addressed as follows:


By mail: Commissioner for Patents
 Box DAC
 Washington, D.C. 20231

By FAX: (703) 308-6916
 Attn.: Office of Petitions

Application No. 10/067,106

By hand: Crystal Plaza Four, Suite 3C23
2201 S. Clark Place
Arlington, VA

Telephone inquiries regarding this decision should be directed to the undersigned at (703) 305-0310.


Alesia M. Brown
Petitions Attorney
Office of Petitions
Office of the Deputy Commissioner
for Patent Examination Policy

From: MELISSA E. DINGMANN (612)373-6900
SCHWEGMAN, LUNDBERG, WOESSNER & KLU
121 S. 8TH STREET
TCF TOWER, SUITE 1600
MINNEAPOLIS, MN, 55402

REVENUE BARCODE

**FedEx.****To: Sajit Bhaskaran (612)373-6900**

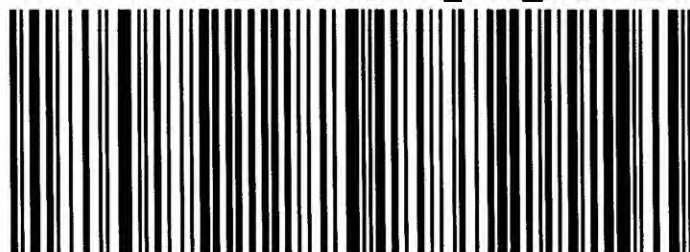
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Ref: 1384.004US3 Smith



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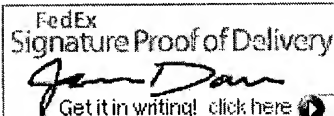
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Ship Date: January 9, 2003

Recipient:

SAJIT BHASKARAN

1336 AVOSET TERRACE
SUNNYVALE, CA 94087
US

Shipper:

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US

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Via Federal Express

January 7, 2003

Sajit Bhaskaran
1336 Avoset Terrace
Sunnyvale, CA 94087

Re: Docket # 1384.004US3

U.S. Patent Application Serial Number: 10/067,106

Title: SYSTEM AND PROTOCOL FOR FRAME RELAY SERVICE OVER THE
INTERNET

Dear Mr. Bhaskaran:

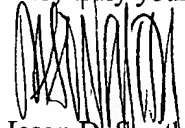
Enclosed is a Combined Declaration and Power of Attorney document that must be executed to complete the filing requirements for the above-referenced patent application. *We have corrected your home address and citizenship.* Please review the enclosed copy of the application as filed and then sign and date the document where indicated.

We have also enclosed an Assignment document to be executed. If possible, please do so in the presence of a Notary Public.

If the inventor information is incorrect on either of the above-mentioned documents, please manually correct the errors and initial all changes.

Please return the original set of executed documents to my attention via your earliest convenience. If you have any questions regarding this matter, please contact Thomas F. Brennan at (612) 373-6909.

Very truly yours,



Jason D. Smith

Case Management Assistant

Enclosures

Patent Protection for High Technology

Intellectual Property Attorneys

1600 TCF Tower, 121 South Eighth Street, Minneapolis, Minnesota 55402
Telephone: 612•373•6900 Fax: 612•339•3061 Website: www.slwk.com

Jason Smith

From: Jason Smith
Sent: Wednesday, January 08, 2003 5:20 PM
To: 'sajit@mindspring.com'; 'sajit@aspen-networks.com'
Subject: RE: 1384.004us3 - Formal Documents

Dear Sajit,

The documents will not be sent out until tomorrow (Thursday, January 9, 2003). I apologize for the delay.

We will be providing Abraham Matthews, Lianghwa Jou and Sachin Desai with an identical set.

Thank you for your patience.

Jason D. Smith

-----Original Message-----

From: Jason Smith
Sent: Monday, January 06, 2003 4:29 PM
To: 'sajit@mindspring.com'; 'sajit@aspen-networks.com'
Subject: 1384.004us3 - Formal Documents

S/N 10/067106
SLWK 1384.004us3
Filed February 4, 2002
Client Cosine Communications
Title SYSTEM AND METHOD FOR HIERARCHICAL METERING IN A VIRTUAL ROUTER BASED
NETWORK SWITCH

Dear Sajit,

My name is Jason D. Smith, a Case Manager employed at Schwegman, Lundberg, Woessner and Kluth. I am writing to notify you that I will be sending an updated Combined Declaration / Power of Attorney and an Assignment with a copy of the Application as filed to you via Federal Express on Tuesday, January 7, 2003 at the following address: Sajit Bhaskaran; 1336 Avoset Terrace; Sunnyvale, CA 94087. I will also include a copy of this email.

If you have any comments or questions regarding this paperwork, please let me know. I will either reply to the best of my ability, or defer to the appropriate authority on the matter.

Please acknowledge receipt of this communication after you have received the package, and briefly explain whether or not you will be able to return the executed documents.

Thank you for your time and patience.

Sincerely,

Jason D. Smith
Schwegman, Lundberg, Woessner & Kluth, P.A.
Case Management Group
1600 TCF Tower; 121 South Eighth Street
Minneapolis, MN 55402
(p) 612-373-6934 (f) 612-339-3061 <http://www.slwk.com>

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SCHWEGMAN ■ LUNDBERG ■ WOESSNER ■ KLUTH

United States Patent Application
COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled: **SYSTEM AND PROTOCOL FOR FRAME RELAY SERVICE OVER THE INTERNET.**

The specification of which was filed on February 4, 2002 as application serial no. 10/067,106.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with 37 C.F.R. § 1.56 (attached hereto). I also acknowledge my duty to disclose all information known to be material to patentability which became available between a filing date of a prior application and the national or PCT international filing date in the event this is a Continuation-In-Part application in accordance with 37 C.F.R. §1.63(e).

I hereby claim foreign priority benefits under 35 U.S.C. §119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on the basis of which priority is claimed:

No such claim for priority is being made at this time.

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below:

No such claim for priority is being made at this time.

I hereby claim the benefit under 35 U.S.C. § 120 or 365(c) of any United States and PCT international application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose material information as defined in 37 C.F.R. § 1.56(a) which became available between the filing date of the prior application and the national or PCT international filing date of this application:

Application Number

09/663,486

09/871,165

Filing Date

September 13, 2000

May 31, 2001

Status

Closed

Pending

I hereby appoint the following attorney(s) and/or patent agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith:

Anglin, J. Michael	Reg. No. 24,916	Haack, John L.	Reg. No. 36,154	Nama, Kash	Reg. No. 44,255
Arora, Suneel	Reg. No. 42,267	Harris, Robert J.	Reg. No. 37,346	Nelson, Albin J.	Reg. No. 28,650
Beekman, Marvin L.	Reg. No. 38,377	Jackson Huebsch, Katharine A.	Reg. No. 47,670	Nielsen, Walter W.	Reg. No. 25,539
Bianchi, Timothy E.	Reg. No. 39,610	Jurkovich, Patti J.	Reg. No. 44,813	Padys, Danny J.	Reg. No. 35,635
Billion, Richard E.	Reg. No. 32,836	Kalis, Janal M.	Reg. No. 37,650	Parker, J. Kevin	Reg. No. 33,024
Black, David W.	Reg. No. 42,331	Klima-Silberg, Catherine I.	Reg. No. 40,052	Perdok, Monique M.	Reg. No. 42,989
Brennan, Thomas F.	Reg. No. 35,075	Kluth, Daniel J.	Reg. No. 32,146	Peret, Andrew R.	Reg. No. 41,246
Chadwick, Robin A.	Reg. No. 36,477	Lacy, Rodney L.	Reg. No. 41,136	Peterson, David C.	Reg. No. 47,857
Clark, Barbara J.	Reg. No. 38,107	Lemaire, Charles A.	Reg. No. 36,198	Prout, William F.	Reg. No. 33,995
Clise, Timothy B.	Reg. No. 40,957	LeMoine, Dana B.	Reg. No. 40,062	Schumm, Sherry W.	Reg. No. 39,422
Cochran, David R.	Reg. No. 46,632	Lundberg, Steven W.	Reg. No. 30,568	Schwegman, Micheal L.	Reg. No. 25,816
Dahl, John M.	Reg. No. 44,639	Maki, Peter C.	Reg. No. 42,832	Speier, Gary J.	Reg. No. 45,458
Drake, Eduardo E.	Reg. No. 40,594	Malen, Peter L.	Reg. No. 44,894	Steffey, Charles E.	Reg. No. 25,179
Embretson, Janet E.	Reg. No. 39,665	Mates, Robert E.	Reg. No. 35,271	Stordal, Leif T.	Reg. No. 46,251
Forrest, Bradley A.	Reg. No. 30,837	McCrackin, Ann M.	Reg. No. 42,858	Terry, Kathleen R.	Reg. No. 31,884
Gamon, Owen J.	Reg. No. 36,143	McGough, Kevin J.	Reg. No. 31,279	Tong, Viet V.	Reg. No. 45,416
Gorrie, Gregory J.	Reg. No. 36,530	McTavish, Hugh E.	Reg. No. 48,341	Viksnins, Ann S.	Reg. No. 37,748
Gortych, Joseph E.	Reg. No. 41,791	Mehrle, Joseph P.	Reg. No. 45,535	Woessner, Warren D.	Reg. No. 30,440
Greaves, John N.	Reg. No. 40,362	Muller, Mark V.	Reg. No. 37,509		

I hereby authorize them to act and rely on instructions from and communicate directly with the person/assignee/attorney/firm/organization/who/which first sends/sent this case to them and by whom/which I hereby declare that I have consented after full disclosure to be represented unless/until I instruct Schwegman, Lundberg, Woessner & Kluth, P.A. to the contrary.

Please direct all correspondence in this case to Schwegman, Lundberg, Woessner & Kluth, P.A. at the address indicated below:

P.O. Box 2938, Minneapolis, MN 55402
Telephone No. (612)373-6900

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of joint inventor number 1 : **Abraham R. Matthews**

Citizenship: **India**

Residence: **San Jose, CA**

Post Office Address: **933 Willowleaf Drive
Apt. 605
San Jose, CA 95128**

Signature: _____
Abraham R. Matthews

Date: _____

Full Name of joint inventor number 2 : **Sajit Bhaskaran**

Citizenship: **Singapore**

Residence: **Sunnyvale, CA**

Post Office Address: **1336 Avoset Terrace
Sunnyvale, CA 94087**

Signature: _____
Sajit Bhaskaran

Date: _____

☒ Additional inventors are being named on separately numbered sheets, attached hereto.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of joint inventor number 3 : **Lianghwa Jou**
Citizenship: **United States of America** Residence: **Incline Village, NV**
Post Office Address: **1081 Oxen Road**
Incline Village, NV 89451

Signature: _____ Date: _____
Lianghwa Jou

Full Name of joint inventor number 4 : **Sachin Desai**
Citizenship: **India** Residence: **Santa Clara, CA**
Post Office Address: **900 Pepper Tree Lane**
#514
Santa Clara, CA 95051

Signature: _____ Date: _____
Sachin Desai

Full Name of inventor:
Citizenship: Residence:
Post Office Address:

Signature: _____ Date: _____

Full Name of inventor:
Citizenship: Residence:
Post Office Address:

Signature: _____ Date: _____

§ 1.56 Duty to disclose information material to patentability.

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is canceled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is canceled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

- (1) prior art cited in search reports of a foreign patent office in a counterpart application, and
- (2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

- (1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or
- (2) It refutes, or is inconsistent with, a position the applicant takes in:
 - (i) Opposing an argument of unpatentability relied on by the Office, or
 - (ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

- (1) Each inventor named in the application;
- (2) Each attorney or agent who prepares or prosecutes the application; and
- (3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.

ASSIGNMENT

WHEREAS, WE, Abraham R. Matthews, residing at 933 Willowleaf Drive, Apt. 605, San Jose, CA 95128, and Sajit Bhaskaran, residing at 1336 Avoset Terrace, Sunnyvale, CA 94087, and Lianghwa Jou, residing at 1081 Oxen Road, Incline Village, NV 89451, and Sachin Desai, residing at 3770 Flora Vista Ave., #1705, Santa Clara, CA 95051, made certain new and useful inventions and improvements for which We filed an application for Letters Patent of the United States on February 4, 2002, which application was assigned U.S. patent application serial number 10/067,106, and is entitled SYSTEM AND PROTOCOL FOR FRAME RELAY SERVICE OVER THE INTERNET.

AND WHEREAS, CoSine Communications, Inc., a corporation organized and existing under and by virtue of the laws of the State of Delaware, and having an office and place of business at 1200 Bridge Parkway, Redwood City, CA 94065, (hereinafter "Assignee") is desirous of acquiring the entire right, title and interest in and to said inventions, improvements and application and in and to the Letters Patent to be obtained therefore;

NOW, THEREFORE, to all whom it may concern, be it known that for good and valuable consideration, the receipt and sufficiency whereof is hereby acknowledged, we have sold, assigned, and transferred, and by these presents do sell, assign and transfer unto said Assignee, its successors or assigns, the entire right, title and interest for all countries in and to all inventions and improvements disclosed in the aforesaid application, and in and to the said application, all divisions, continuations, continuations-in-part, or renewals thereof, all Letters Patent which may be granted therefrom, and all reissues or extensions of such patents, and in and to any and all applications which have been or shall be filed in any foreign countries for Letters Patent on the said inventions and improvements, including an assignment of all rights under the provisions of the International Convention, and all Letters Patent of foreign countries which may be granted therefrom; and we do hereby authorize and request the Commissioner of Patents and Trademarks to issue any and all United States Letters Patent for the aforesaid inventions and improvements to the said Assignee as the assignee of the entire right, title and interest in and to the same, for the use of the said Assignee, its successors and assigns.

AND, for the consideration aforesaid, we do hereby agree that we and our executors and legal representatives will make, execute and deliver any and all other instruments in writing including any and all further application papers, affidavits, assignments and other documents, and will communicate to said Assignee, its successors and representatives all facts known to us relating to said improvements and the history thereof and will testify in all legal proceedings and generally do all things which may be necessary or desirable more effectually to secure to and vest in said Assignee, its successors or assigns the entire right, title and interest in and to the said improvements, inventions, applications, Letters Patent, rights, titles, benefits, privileges and advantages hereby sold, assigned and conveyed, or intended so to be.

AND, furthermore we covenant and agree with said Assignee, its successors and assigns, that no assignment, grant, mortgage, license or other agreement affecting the rights and property herein conveyed has been made to others by me/us and that full right to convey the same as herein expressed is possessed by us.

IN TESTIMONY WHEREOF, I have hereunto set my hand this ____ day of _____, 2002.

Abraham R. Matthews

STATE OF _____)
)ss.
COUNTY OF _____)

On this ____ day of _____, 2002 before me personally appeared Abraham R. Matthews
to me known and known to me to be the person described in and who executed the foregoing
instrument, and he/she duly acknowledged to me that he/she executed the same for the uses and
purposes therein set forth.

[SEAL]

Notary Public

IN TESTIMONY WHEREOF, I have hereunto set my hand this ____ day of _____, 2002.

Sajit Bhaskaran

STATE OF _____)
)ss.
COUNTY OF _____)

On this ____ day of _____, 2002 before me personally appeared Sajit Bhaskaran to me known and known to me to be the person described in and who executed the foregoing instrument, and he/she duly acknowledged to me that he/she executed the same for the uses and purposes therein set forth.

[SEAL]

Notary Public

IN TESTIMONY WHEREOF, I have hereunto set my hand this ____ day of _____, 2002.

Lianghwa Jou

STATE OF _____)
)ss.
COUNTY OF _____)

On this ____ day of _____, 2002 before me personally appeared Lianghwa Jou to me known and known to me to be the person described in and who executed the foregoing instrument, and he/she duly acknowledged to me that he/she executed the same for the uses and purposes therein set forth.

[SEAL]

Notary Public

Docket No.: 1384.004US3
Serial No.: 10/067,106
Filing Date: February 4, 2002
Page 4 of 4

IN TESTIMONY WHEREOF, I have hereunto set my hand this ____ day of _____, 2002.

Sachin Desai

STATE OF _____)
)ss.
COUNTY OF _____)

On this ____ day of _____, 2002 before me personally appeared Sachin Desai to me known and known to me to be the person described in and who executed the foregoing instrument, and he/she duly acknowledged to me that he/she executed the same for the uses and purposes therein set forth.

[SEAL]

Notary Public

In re Patent Application of: Abraham R. Matthews et al.
Title: SYSTEM AND PROTOCOL FOR FRAME RELAY SERVICE OVER THE
INTERNET
Attorney Docket No.: 1384.004US3

CON

Receipt is hereby acknowledged for the following in the United States Patent and
Trademark Office:

CONTENTS: UTILITY PATENT APPLICATION (CONTINUATION): Specification
(15 pgs, including claims numbered 1 through 33 and a 1 page Abstract); Formal
Drawing(s) (7 sheets); Unsigned Combined Declaration and Power of Attorney (4 pgs);
Information Disclosure Statement (1 pgs); Form 1449 (1 pgs) ;return postcard and transmittal
sheet.

FILED WITHOUT APPLICATION FILING FEE.

EXPRESS MAIL LABEL NO. EV041075860US
Mailed: February 4, 2002
TFB/kll

EV041075860US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: Abraham R. Matthews et al.

Title: SYSTEM AND PROTOCOL FOR FRAME RELAY SERVICE OVER THE INTERNET

Attorney Docket No.: 1384.004US3

PATENT APPLICATION TRANSMITTAL

BOX PATENT APPLICATION

Commissioner for Patents

Washington, D.C. 20231

We are transmitting herewith the following attached items and information (as indicated with an "X"):

- ☒ Return postcard.
- ☒ **CONTINUATION** of prior Patent Application No. 09/871,165 (under 37 CFR § 1.53(b)) comprising:
- ☒ Specification (15 pgs, including claims numbered 1 through 33 and a 1 page Abstract).
- ☒ Formal Drawing(s) (7 sheets).
- ☒ Unsigned Combined Declaration and Power of Attorney (4 pgs).
- ☒ Incorporation by Reference: *The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied herewith, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.*
- ☒ Information Disclosure Statement (1 pgs), Form 1449 (1 pgs). References NOT enclosed, cited in prior application.

The filing fee (NOT ENCLOSED) will be calculated as follows:

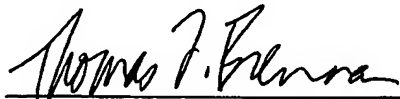
	No. Filed	No. Extra	Rate	Fee
TOTAL CLAIMS	33 - 20 =	13	x 18 =	\$234.00
INDEPENDENT CLAIMS	4 - 3 =	1	x 84 =	\$84.00
[] MULTIPLE DEPENDENT CLAIMS PRESENTED				\$0.00
BASIC FEE				\$740.00
TOTAL				\$1,058.00

Please consider this a PETITION FOR EXTENSION OF TIME for sufficient number of months to enter these papers. THE FILING FEE WILL BE PAID UPON RECEIPT OF THE NOTICE TO FILE MISSING PARTS.

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.

P.O. Box 2938, Minneapolis, MN 55402 (612-373-6900)

Customer Number 21186

By: 
Atty: Thomas F. Brennan
Reg. No. 35,075

"Express Mail" mailing label number: EV041075860US

Date of Deposit: February 4, 2002

This paper or fee is being deposited on the date indicated above with the United States Postal Service pursuant to 37 CFR 1.10, and is addressed to The Commissioner for Patents, Box Patent Application, Washington, D.C. 20231.

SCHWEGMAN ■ LUNDBERG ■ WOESSNER ■ KLUTH

United States Patent Application
COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled: **SYSTEM AND PROTOCOL FOR FRAME RELAY SERVICE OVER THE INTERNET.**

The specification of which is attached hereto.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with 37 C.F.R. § 1.56 (attached hereto). I also acknowledge my duty to disclose all information known to be material to patentability which became available between a filing date of a prior application and the national or PCT international filing date in the event this is a Continuation-In-Part application in accordance with 37 C.F.R. §1.63(e).

I hereby claim foreign priority benefits under 35 U.S.C. §119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on the basis of which priority is claimed:

No such claim for priority is being made at this time.

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below:

No such claim for priority is being made at this time.

I hereby claim the benefit under 35 U.S.C. § 120 or 365(c) of any United States and PCT international application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose material information as defined in 37 C.F.R. § 1.56(a) which became available between the filing date of the prior application and the national or PCT international filing date of this application:

No such claim for priority is being made at this time.

I hereby appoint the following attorney(s) and/or patent agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith:

Anglin, J. Michael	Reg. No. 24,916	Huebsch, Joseph C.	Reg. No. 42,673	Nelson, Albin J.	Reg. No. 28,650
Bianchi, Timothy E.	Reg. No. 39,610	Jurkovich, Parti J.	Reg. No. 44,813	Nielsen, Walter W.	Reg. No. 25,539
Billion, Richard E.	Reg. No. 32,836	Kalis, Janal M.	Reg. No. 37,650	Oh, Allen J.	Reg. No. 42,047
Black, David W.	Reg. No. 42,331	Kaufmann, John D.	Reg. No. 24,017	Padys, Danny J.	Reg. No. 35,635
Brennan, Leoniede M.	Reg. No. 35,832	Klima-Silberg, Catherine I.	Reg. No. 40,052	Parker, J. Kevin	Reg. No. 33,024
Brennan, Thomas F.	Reg. No. 35,075	Kluth, Daniel J.	Reg. No. 32,146	Perdok, Monique M.	Reg. No. 42,989
Brooks, Edward J., III	Reg. No. 40,925	Lacy, Rodney L.	Reg. No. 41,136	Prout, William F.	Reg. No. 33,995
Chu, Dinh C.P.	Reg. No. 41,676	Lemaire, Charles A.	Reg. No. 36,198	Schumm, Sherry W.	Reg. No. 39,422
Clark, Barbara J.	Reg. No. 38,107	LeMoine, Dana B.	Reg. No. 40,062	Schwegman, Micheal L.	Reg. No. 25,816
Clise, Timothy B.	Reg. No. 40,957	Lundberg, Steven W.	Reg. No. 30,568	Scott, John C.	Reg. No. 38,613
Dahl, John M.	Reg. No. 44,639	Maeyaert, Paul L.	Reg. No. 40,076	Smith, Michael G.	Reg. No. 45,368
Drake, Eduardo E.	Reg. No. 40,594	Maki, Peter C.	Reg. No. 42,832	Speier, Gary J.	Reg. No. 45,458
Embretson, Janet E.	Reg. No. 39,665	Malen, Peter L.	Reg. No. 44,894	Steffey, Charles E.	Reg. No. 25,179
Fordenbacher, Paul J.	Reg. No. 42,546	Mates, Robert E.	Reg. No. 35,271	Terry, Kathleen R.	Reg. No. 31,884
Forrest, Bradley A.	Reg. No. 30,837	McCrackin, Ann M.	Reg. No. 42,858	Tong, Viet V.	Reg. No. 45,416
Gamon, Owen J.	Reg. No. 36,143	Moore, Charles L., Jr.	Reg. No. 33,742	Viksnins, Ann S.	Reg. No. 37,748
Harris, Robert J.	Reg. No. 37,346	Nama, Kash	Reg. No. 44,255	Woessner, Warren D.	Reg. No. 30,440

I hereby authorize them to act and rely on instructions from and communicate directly with the person/assignee/attorney/firm/organization/who/which first sends/sent this case to them and by whom/which I hereby declare that I have consented after full disclosure to be represented unless/until I instruct Schwegman, Lundberg, Woessner & Kluth, P.A. to the contrary.

Please direct all correspondence in this case to Schwegman, Lundberg, Woessner & Kluth, P.A. at the address indicated below:
P.O. Box 2938, Minneapolis, MN 55402
Telephone No. (612)373-6900

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of joint inventor number 1 : **Abraham R. Matthews**

Citizenship: **India**

Residence: **San Jose, CA**

Post Office Address: **933 Willowleaf Drive
Apt. 605
San Jose, CA 95128**

Signature: _____

Abraham R. Matthews

Date: _____

Full Name of joint inventor number 2 : **Sajit Bhaskaran**

Citizenship: **United States of America**

Residence: **Redwood City, CA**

Post Office Address: **3200 Bridge Parkway
Redwood City, CA 94065**

Signature: _____

Sajit Bhaskaran

Date: _____

X Additional inventors are being named on separately numbered sheets, attached heret .

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of joint inventor number 3 : **Lianghwa Jou**
Citizenship: **United States of America** Residence: **Redwood City, CA**
Post Office Address: **3200 Bridge Parkway**
Redwood City, CA 94065

Signature: _____ Date: _____
Lianghwa Jou

Full Name of inventor:
Citizenship: Residence:
Post Office Address:

Signature: _____ Date: _____

Full Name of inventor:
Citizenship: Residence:
Post Office Address:

Signature: _____ Date: _____

Full Name of inventor:
Citizenship: Residence:
Post Office Address:

Signature: _____ Date: _____

§ 1.56 Duty to disclose information material to patentability.

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is canceled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is canceled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

- (1) prior art cited in search reports of a foreign patent office in a counterpart application, and
- (2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

- (1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or
- (2) It refutes, or is inconsistent with, a position the applicant takes in:
 - (i) Opposing an argument of unpatentability relied on by the Office, or
 - (ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

- (1) Each inventor named in the application;
- (2) Each attorney or agent who prepares or prosecutes the application; and
- (3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.

S/N Unknown

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Abraham R. Matthews et al.	Examiner: Unknown
Serial No.:	Unknown	Group Art Unit: Unknown
Filed:	Herewith	Docket: 1384.004US3
Title:	SYSTEM AND PROTOCOL FOR FRAME RELAY SERVICE OVER THE INTERNET	

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
Washington, D.C. 20231

In compliance with the duty imposed by 37 C.F.R. § 1.56, and in accordance with 37 C.F.R. §§ 1.97 *et. seq.*, the enclosed materials are brought to the attention of the Examiner for review in connection with the above-identified patent application. Pursuant to the provisions of MPEP 609, Applicants request that a copy of the 1449 form, initialed as being considered by the Examiner, be returned to the Applicants.

In accordance with 37 C.F.R. §1.98(d), copies of the listed documents are not provided as these references were previously cited by or submitted to the U.S. Patent Office in connection with Applicants' prior U.S. application, Serial No. 09/871,165, filed on May 31, 2001, which is relied upon for an earlier filing date under 35 U.S.C. §120.

Applicants respectfully request consideration of these references during prosecution of the above-identified matter. The Examiner is invited to contact the Applicants' Representative at the below-listed telephone number if there are any questions regarding this communication.

Respectfully submitted,

ABRAHAM R. MATTHEWS ET AL.

By their Representatives,

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
P.O. Box 2938
Minneapolis, MN 55402
(612) 373-6909

Date

Feb. 4, 2002

By

Thomas F. Brennan

Thomas F. Brennan
Reg. No. 35,075

"Express Mail" mailing label number: EV041075860US

Date of Deposit: February 4, 2002

This paper or fee is being deposited on the date indicated above with the United States Postal Service pursuant to 37 CFR 1.10, and is addressed to The Commissioner for Patents, Box Patent Application, Washington, D.C. 20231.

Form 1449*	Atty. Docket No.: 1384.004US3	Serial No. Unknown
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	Applicant: Abraham R. Matthews et al.	
	Filing Date: Herewith	Group: Unknown

U.S. PATENT DOCUMENTS

**Examiner Initial	Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate
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FOREIGN PATENT DOCUMENTS

**Examiner Initial	Document Number	Date	Country	Class	Subclass	Translation	
						Yes	No

OTHER DOCUMENTS

(Including Author, Title, Date, Pertinent Pages, Etc.)

**Examiner Initial	
	"Digital Subscriber Lines and Managed Network-based Services: A Perfect--and Profitable--Marriage", <u>CoSine Communications White Paper</u> , pp. 1-12, (2000)
	"IP and Frame Relay: Bridging the Gap for Seamless and Secure Virtual Private Networking", <u>Cosine Communications White Paper</u> , pp. 1-8, (2000)

Examiner	Date Considered
----------	-----------------

*Substitute Disclosure Statement Form (PTO-1449)

**EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

SYSTEM AND PROTOCOL FOR FRAME RELAY SERVICE OVER THE INTERNET

Related Applications

5 This application is a continuation of U.S. Serial No. 09/871,165, filed on May 31, 2001, which is a continuation of U.S. Serial No. 09/663,486, filed on September 13, 2000.

Field of the Invention

10 The present invention relates generally communications, and more particularly to a system and protocol for frame relay communications over the Internet.

Background Information

 Frame Relay is an access standard defined by the ITU-T in the I.122 recommendation, "Framework for Providing Additional Packet Mode Bearer Services."
15 Frame Relay services employ a form of packet switching analogous to a streamlined version of X.25 networks. The packets are in the form of "frames" which can be variable in length. Thus a key advantage is that a frame relay network can accommodate data packets of various sizes and that are associated with virtually any native data protocol. Accordingly, frame relay services have become a popular
20 replacement for dedicated or private leased-line connections between enterprise LANs located at multiple sites.

 Today, however, service providers (SPs) and their subscribers have another, more cost effective alternative for connecting different sites securely, the Internet. Enterprise subscribers want to preserve their investments in Frame Relay equipment
25 while extending the reach of their private networks to new locations using a lower cost Internet (IP) solution. They also want to extend secure Internet access to existing locations served by frame relay without the additional expense of adding or replacing customer premises equipment (CPE) or acquiring access lines to these locations. They

want to make the transition in a controlled manner at their own pace to minimize risks and maintain access to the existing frame relay network during the migration.

Additionally, current frame relay networks have some limitations. They have no built in access from the frame relay network or cloud to the Internet. Typically, separate arrangements are made for Internet access. Current frame relay networks also lack the Internet security protocol (IPSec) encryption and firewall features required for secure Internet access from corporations. Further, typical service level agreements (SLAs) for frame relay service as defined by the Frame Relay Forum (FRF) are fairly basic and conservative with little opportunity for provider or service differentiation. In contrast, differentiated services allows IP networks to offer enhanced services over and beyond what is currently being standardized by the FRF for frame relay service.

Accordingly, for all the reasons discussed above, and for other reasons that will become apparent upon reading and understanding the present specification, there is a need for a system and protocol that permits frame relay service over the Internet that is secure and provides the flexibility, economy and features provided by the Internet.

Summary of the Invention

In accordance with the present invention, a system for communications over the Internet includes at least one router connectable to a first user or subscriber location. An Internet protocol service processing switch (IPSX) is connected to the at least one router to format or encapsulate the message for secure transmission over the Internet. The message is then preferably transmitted over the Internet via an Internet Protocol Security (IPSec) tunnel for secure transmission to the addressed destination.

In accordance with another embodiment of the present invention, a method for communication over the Internet includes generating a frame relay message. Overhead information may be stripped from the frame relay message and valid frames encapsulated in a frame relay over Internet protocol (FOIP) header. The FOIP header and message payload are encapsulated in a user datagram protocol (UDP/IP) and then

the UDP/IP encapsulated message is transmitted over the Internet to a predetermined destination preferably via an IPSec tunnel.

Brief Description of the Drawings

5 Figure 1 is a block schematic diagram of a system for communications over the Internet in accordance with one embodiment of the present invention.

Figure 2 is a block schematic diagram of a system for communications over the Internet in accordance with another embodiment of the present invention.

10 Figure 3 is a block schematic diagram of a system for communications over the Internet for dial-up user access in accordance with a further embodiment of the present invention.

Figure 4 is a block schematic diagram of an IP-enabled frame relay network layered with advanced Internet Application services in accordance with another embodiment of the present invention.

15 Figure 5 is an illustration of the frame relay frame structure in accordance with one embodiment of the present invention.

Figure 6 is an illustration of the frame relay encapsulation of the IP datagram in accordance with one embodiment of the present invention.

20 Figure 7 is a flow chart of a method for frame relay communication over the Internet in accordance with one embodiment of the present invention.

Detailed Description of the Embodiments

25 In the following detailed description of the embodiments, reference is made to the accompanying drawings which form a part hereof, and in which is shown by way of illustration specific embodiments in which the invention may be practiced. It is to be understood that other embodiments may be utilized and structural changes may be made without departing from the scope of the present invention.

Referring initially to Figure 1, a schematic diagram of a system for communications over the Internet in accordance with at least one embodiment of the

present invention is shown. The system 100 includes a plurality of routers 102 at different locations or sites, Each of the routers 102 is connected to at least one user or subscriber 104. Each router 102 also preferably is associated with at least two data link connection identifiers (DLCIs) 106 for redundancy. The DLCIs 106 are shown in
5 Figure 1 as separate elements but may actually be part of the router 102. The system may also include multiple routers 102 at a site for redundancy.

The router 102/DLCI 106 is connected to an Internet protocol service processing switch (IPSX) 108. The IPSX may be an IPSX 9000™ as manufactured and sold by CoSine Communications, Inc., Redwood City California. In the embodiment shown in
10 Figure 1, the IPSX includes a virtual subscriber switch (VS) 110 coupled at one end to the router 102/DLCI 106 and connected to a virtual router (VR) 112 at another end or terminal. The virtual router (VR) 112 is coupled to a firewall 114 and the firewall 114 is connected to an Internet protocol security (IPSec) module 116. The IPSec 116 is then connectable to the Internet 118 for transmission of frame relay messages to other
15 users/subscribers 104 or locations on the virtual private network (VPN) 120 formed by the system 100. In accordance with the present invention, the connection via the Internet is preferably via an IPSec tunnel 122 to provide secured transmissions from one location or user 104 to another. The connection via the Internet between one location or user 104 and another location or user 104 is analogous to a frame relay permanent
20 virtual circuit (PVC).

The system 100 also includes a transport protocol (TP) for transmitting messages over the Internet. The transport protocol for frame relay payloads is based on user datagram protocol (UDP/IP), which is optionally IPSec ESP (enhanced service provider) protected in the transport mode. IPSec protection may be made the default. The IPSec
25 tunnel 122 uses as the source IP address, the VR's address at the source and the address of the destination VR 112 at the remote end.

The payload transport protocol is complemented by a switch-to-switch signaling protocol (SSFOIP) that operates in parallel. Because multiple virtual switches 110 realizations will exist in distributed fashion, periodic synchronization between the

virtual switches 110 will be necessary. The SSFOIP will also be based on UDP/IP. The SSFOIP is used to communicate status information about the different components within the system and to announce and set up the creation of new components or DLCIs for future service. The SSFOIP protocol header and payload are encapsulated in UDP.

5 The selection of non-hard state transport protocol such as UDP allows hot standby virtual switches to be easily implemented in the future. This protocol also makes the implementation simpler, more scalable and less susceptible to certain kinds of attacks. Additionally, it allows leverage of any future IP multicast infrastructure that might be deployed.

10 The virtual switch 110 will also implement the frame relay local management interface (LMI) 124 function for requesting and responding to status inquiry messages from other components in the system 100. For dual homed customer provided equipment (CPE), such as dual routers or dual bridges or other equipment, failure to respond accurately will result in black holed traffic. If a DLCI failure occurs, the system
15 will be able to reroute using an Open System Interconnection (OSI) layer 3 or 2 route calculation algorithm. The SSFOIP is used to communicate status information between the components of the system 100.

 The system 100 also includes an operating support system (OSS) 126 connected to the frame relay network 128. The initial provisioning or set up of the private virtual
20 circuits (PVCs) and DLCIs may be done by the OSS 126 and communicated to each IPSX 108 by simple network management protocol (SNMP) which then sets up the VSs 110. A group of VSs that make up the virtual private network (VPN) 120 may then initiate SSFOIP exchanges. The OSS 126 will also be responsible for installing in each VS 110 the information or addresses to reach all other VSs in the VPN 120 or system
25 100.

 Several protocols are currently being transported over frame relay networks that require frame sequence preservation. Two such protocols are system network architecture (SNA) and the IBM NETBIOS. Because normal frame relay service involves explicitly setting up and tearing down PVCs on an end to end basis, sequence

preservation has been straightforward. In the current IP backbone routing environment, however, no such end-to-end mechanism exists. Accordingly, an alternate method of preserving frame sequence is needed.. One approach is to implement an 8-bit sequence number as described in more detail with the in the IP datagram encapsulation of the payload message.

Figure 2 is a block schematic diagram of a system for communications over the Internet in accordance with another embodiment of the present invention. The system 200 of Figure 2 includes a plurality of subscriber remote offices 202. Each of the subscriber remote offices includes a router 204. The subscriber remote office 1 and the subscriber headquarters are each respectively connected to a frame relay network 206. The frame relay network is then connected to an IPSX 208. The IPSX includes a virtual router 210 connected to a firewall 212 and the firewall 212 is also connected to a IPSec module 214 or function. The IPSX 208 may then be connected via an IPSec tunnel 216 to another IPSX 218 through the service providers Internet core 220. In another connection or permanent virtual circuit (PVC), either of the subscriber remote offices 1 or 2 or subscriber headquarters 202 could be interconnected through the Internet to remote office 3 via a router 224 with an IPSec function to provide secure communications over the Internet.

The system 200 of Figure 2 also includes a service management system (SMS) 226 for monitoring and managing traffic flow and to deploy and manage IP features and services to which the user has subscribed. The SMS 226 may be an InVision™ system as provide by CoSine Communications, Inc.

The system 200 of Figure 2 also may include a customer network management (CNM) system 228 to provide reporting, status trend and forecast analysis for network planning and service modification. The CNM 228 may be an InGage™ system as also provided by CoSine Communications.

Figure 3 is a block diagram of a system 300 for communications over the Internet for dial-up user access in accordance with a further embodiment of the present invention. The system 300 is similar to that of Figure 2 except that a dial up user 302

accesses the network or system 300 through the public switched telephone network 304 by dialing a remote access server 306. The dial-up user is then connected to the IPSX 208 through the Internet 222 or the SP IP Core 220.

5 Figure 4 is a schematic block diagram of an IP-enabled frame relay network 400 layered with advanced Internet application services in accordance with another embodiment of the present invention. The network 400 includes a plurality of different site locations 401-406. Each of the sites 401-406 is connected to an IPSX 408, 410 and 412. Sites 401 and 402 are connected to IPSX 408. Sites 403 and 404 are connected to IPSX 410 and sites 405 and 406 are connected to IPSX 412. The IPSXs 408, 410 and 10 412 are connected in a daisy chain fashion by a permanent virtual circuit (PVC) 414, 416 and 418. Each of the PVCs may contain a virtual router (not shown in Figure 4). The IPSXs 408 and 412 each include an intrusion detector 420 and 422 to secure access to the Internet 424 and to guard against hackers.

15 Figure 5 is an illustration a frame relay frame structure 500 in accordance with one embodiment of the present invention. The frame structure 500 includes a high level data link control (HDLC) flag group of bits or field 502, a header field or group of bits 504, an information field 506, a frame check sequence field 508 and another flag field 510. The header field 504 includes a data link connection identifier (DLCI) field or group of bits 512 (high order), a command/response (C/R) field 514, an address extension (E/A) field 516, another low order DLCI field 518, a forward explicit congestion notification (FECN) field (520), a backward explicit congestion notification (BECN) field 522, a discard eligibility (DE) field 524 and another address extension (EA) field 526. The FECN 520 notifies the receiving device that the network is experiencing congestion and the BECN 522 notifies the transmitting device that the 20 network is experiencing congestion. The DE field 524 indicates what may be discarded if the event of network congestion of the subscriber has exceeded his committed burst rate (Bc) or Committed information rate (CIR).

25 Figure 6 is an illustration of the frame relay encapsulation 600 of the IP datagram for transmission over the Internet by the system 100 or 200. The IP datagram

includes an IP field 602, an enhanced service provider (ESP) field 604 indicating enhanced services, a universal datagram (UDP) field 606, a frame relay over IP (FOIP) field 608 and the FOIP payload field 610. The FOIP field 608 may be further broken down into a control (CTRL) field 612, a connection ID (ConnID) field 614 and flag field 616 and a DLCI field 618. The CTRL field 612 may be further broke down into Vers, Rsvd, Seq for frame sequence order, and Len fields 620-626 as shown in Figure 6. The flag field 616 may also be broken down into Rsvd, FECN, BECN and DE fields 628-634 that have functions similar to that previously discussed. The frame relay payload encapsulation process will be described in more detail with respect to Figure 7.

Figure 7 is a flow chart of the method 700 for frame relay communication over the Internet in accordance with one embodiment of the present invention. In action box 702, a message is created or generated by a user or subscriber 104 in the frame relay protocol or format. The frame check sequence (FCS) is validated in action box 704 and if a frame is found to be valid the HDLC flags and FCS fields are stripped from the message format in action box 706. In action box 708 the valid frames are encapsulated in a FOIP header and in action box 710 the FOIP header and payload are encapsulated in UDP. An assigned number is obtained for the destination UDP port in action box 712 and the message resulting from action box 710 may be further encapsulated in IP with or without IPsec protection in action box 714. Integrity checks may be performed by IPsec where applicable in action box 716 or a UDP checksum may be applied to the message in action box 718 if IPsec is not used. In action box 720 the resulting message is transmitted over the Internet to the destination, preferably via an IPsec tunnel 122.

Although specific embodiments have been illustrated and described herein, it will be appreciated by those of ordinary skill in the art that any arrangement which is calculated to achieve the same purpose may be substituted for the specific embodiments shown. This application is intended to cover any adaptations or variations of the present invention. Therefore, it is intended that this invention be limited only by the claims and the equivalents thereof.

What is claimed is:

- 1 1. A system for communications over the Internet, comprising:
2 at least one router connectable to a first user terminal;
3 at least one subscriber virtual frame relay switch (VS) connectable to the
4 at least one router; and
5 at least one virtual router (VR) to connect the VS to the Internet for
6 communications between the first user terminal and a second user terminal over the
7 Internet.
- 1 2. The system of claim 1, further comprising:
2 at least a second router connectable to the second user terminal;
3 at least a second VS connectable to the second router; and
4 at least a second VR to connect the second VS to the Internet for
5 communications between the first user terminal and the second user terminal.
- 1 3. The system of claim 1, wherein the communications over the Internet is via an
2 Internet protocol security (IP Sec) tunnel.
- 1 4. The system of claim 1, further comprising a payload transport protocol for
2 communicating payload information between the first user terminal and the
3 second user terminal.
- 1 5. The system of claim 1, further comprising a switch-to-switch signaling protocol
2 to communicate signaling and other information between the at least one VS
3 and a second VS.
- 1 6. The system of claim 1, further comprising a data link connection identifier
2 (DLCI) to provide routing information to establish a communications link

3 between the first user and the second user and to provide service parameters
4 associated with the communications link.

1 7. The system of claim 6, wherein the DLCI service parameters comprise at least
2 one of a frame size, a committed information rate (CIR), a committed burst rate
3 (Bc), burst excess size (Be) and committed rate measurement error (Tc).

1 8. The system of claim 1, further comprising a local management interface (LMI)
2 associated with the VS to respond to status inquiries and make status inquiries
 regarding other components of the system.

1 9. The system of claim 1, further comprising an operation support system to
2 control establishment and operation of a communications link between the first
3 user terminal and the second user terminal.

1 10. The system of claim 1, wherein the at least one VS implements signaling
2 between other VSs in a virtual private network (VPN) for coordination of
3 information transfer between VSs over the Internet and encapsulation of frame
4 relay header and payload information for communication between users over the
5 Internet.

1 11. The system of claim 1, wherein information is transferred between users in
2 frames, each frame containing a sequence number to preserve the order of the
3 frames.

1 12. A system for communications over the Internet, comprising:
2 a plurality of routers, each router connectable to at least one user
3 terminal;

4 a plurality of Internet protocol service switches (IPSXs), each IPSX is
5 connectable to at least one of the plurality of routers and comprises:
6 a subscriber virtual frame relay switch (VS); and
7 a virtual router (VR) to connect the VS to the Internet for
8 communications between the user terminals associated with each of the routers over the
9 Internet.

1 13. The system of claim 12, wherein communications over the Internet is via an IP
2 Sec tunnel.

1 14. The system of claim 12, further comprising a payload transport protocol for
2 communicating frame relay information between the VSs.

1 15. The system of claim 14, wherein the payload transport protocol organizes the
2 payload information into at least one frame, the at least one frame comprising at
3 least one of the following parameters:
4 a frame sequence number (Seq);
5 a discard enable bit (DE)
6 a forward explicit congestion notification (FECN);
7 a backward explicit congestion notification (BECN);
8 a data link connection identifier (DLCI); and
9 a frame relay over Internet protocol (FOIP) tunnel identification.

1 16. The system of claim 12, wherein the transport protocol is based on user
2 datagram protocol (UDP/IP).

1 17. The system of claim 16, wherein the frame relay protocol is encapsulated in a
2 frame relay over Internet protocol (FOIP) header that is then encapsulated in
3 UDP.

- 1 18. The system of claim 12, further comprising a switch-to-switch signaling
2 protocol (SSFOIP) to communicate signaling and other information between the
3 different VSs and to provide periodic synchronization of the different VSs.
- 1 19. The system of claim 18, wherein the SSFOIP is based on UDP/IP and operates
2 in parallel with the transport protocol.
- 1 20. The system of claim 12, further comprising a frame relay local management
2 interface (LMI) associated with each VS to respond to and send component
3 status inquiries.
- 1 21. The system of claim 12, further comprising an operations support system (OSS),
2 the OSS establishing a permanent virtual circuit (PVC) between each of the user
3 terminals in a virtual private network (VPN).
- 1 22. The system of claim 21, wherein the OSS installs the address information in
2 each VS to communicate with all the other VSs in the VPN.
- 1 23. The system of claim 12, wherein each router has at least one data link
2 connection identifier (DLCI) associated therewith comprising routing
3 information to establish a communications link between the other routers in a
4 virtual private network (VPN) and to provide service parameters associated with
5 the users level of frame relay service.
- 1 24. The system of claim 12, further comprising a services management system to
2 permit IP service providers to deploy, manage and account for IP services.

- 1 25. The system of claim 12, further comprising a customer network management
2 system to permit subscribers to monitor service status, generate reports and
3 forecasts for network planning and service modification.
- 1 26. A system for communications over the Internet, comprising:
2 a frame relay virtual private network (VPN); and
3 at least one IPSX for communication over the Internet.
- 1 27. The system of claim 26, further comprising an IPSec tunnel being formed
2 between at least two IPSXs for secure communications through the Internet
3 between the at least two IPSXs in response to communications between a
4 subscriber associated with each of the IPSXs.
- 1 28. The system of claim 26, further comprising a router with IPSec associated with
2 at least one subscriber for communications between the at least one subscriber
3 and another subscriber at another point in the VPN.
- 1 29. The system of claim 26, further comprising a remote access server (RAS)
2 connectable to the public switched telephone network (PSTN) to provide dial-up
3 access to the frame relay VPN via the Internet.
- 1 30. A method for communicating over the Internet, comprising:
2 generating a frame relay message;
3 encapsulating the frame relay message in a frame relay over IP (FOIP)
4 header;
5 encapsulating the FOIP header and any payload information in user
6 datagram protocol (UDP/IP); and
7 transmitting the UDP/IP encapsulated message over the Internet to a
8 predetermined destination.

-
- 1 31. The method of claim 30, further comprising stripping any overhead information
2 in the frame relay message and encapsulating valid frames in the FOIP header.
- 1 32. The method of claim 30, further comprising encapsulating the FOIP header and
2 payload information in one of IP or IPSec.
- 1 33. The method of claim 30, further comprising transmitting the encapsulated
2 message over the Internet via an IPSec tunnel.

ABSTRACT OF THE INVENTION

The present invention provides a system, protocol and method for communications over the Internet. The system includes at least one router connectable to a first user or subscriber location. An Internet protocol service processing switch (IPSX) is connected to the at least one router to format or encapsulate the message for
5 secure transmission over the Internet. The message is then preferably transmitted over the Internet via an Internet Protocol Security (IPSec) tunnel for secure transmission to the addressed destination.

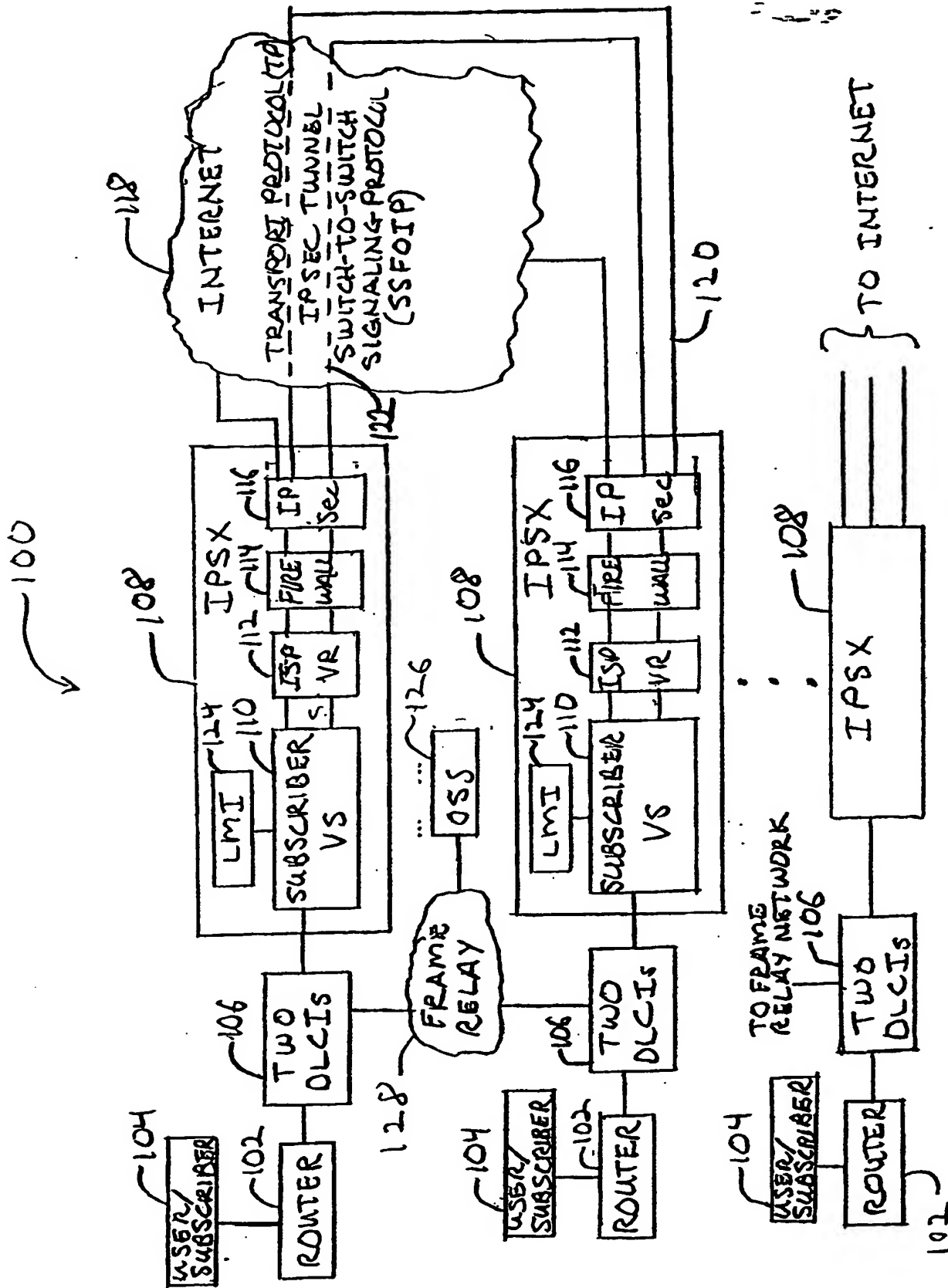
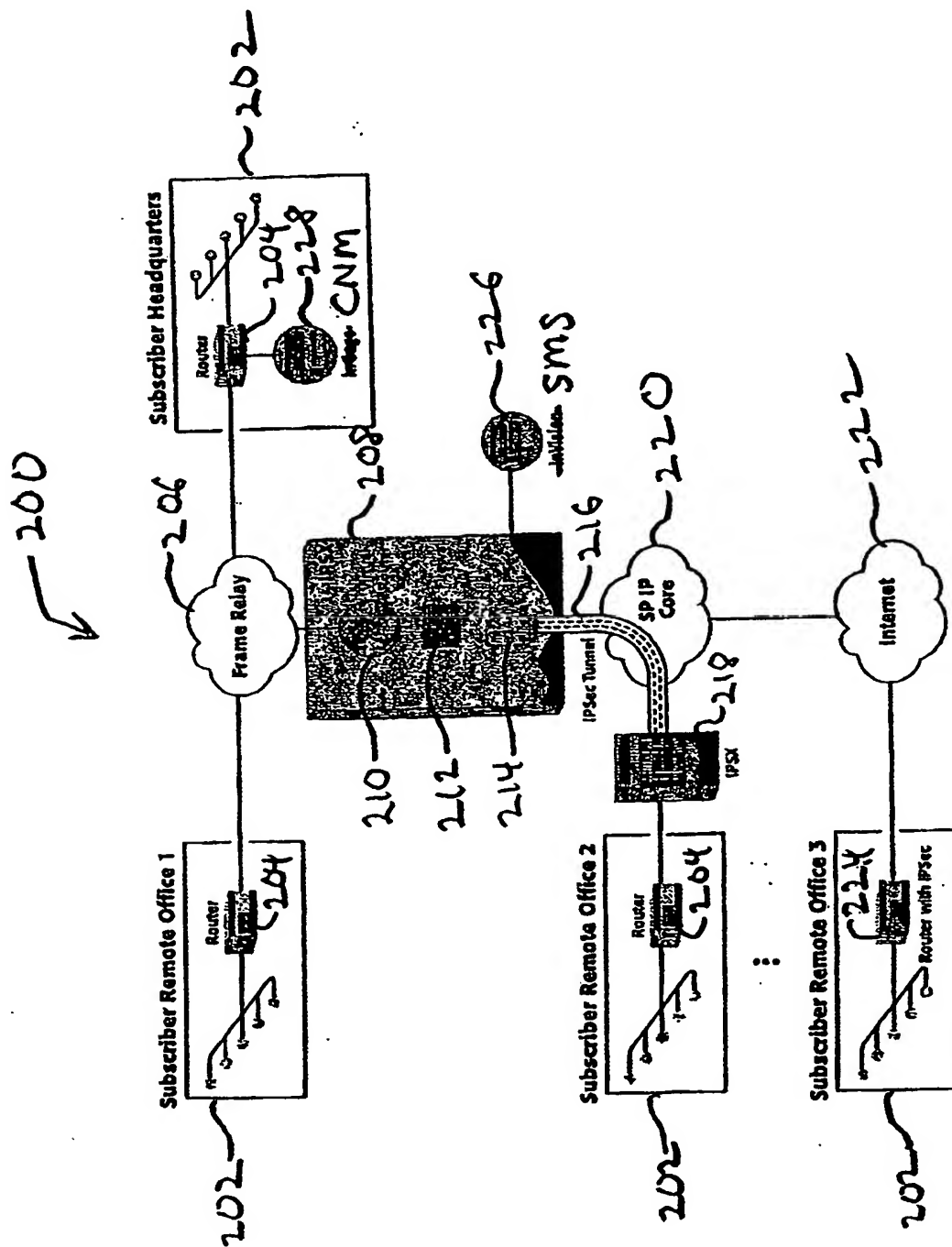


Fig 1



25

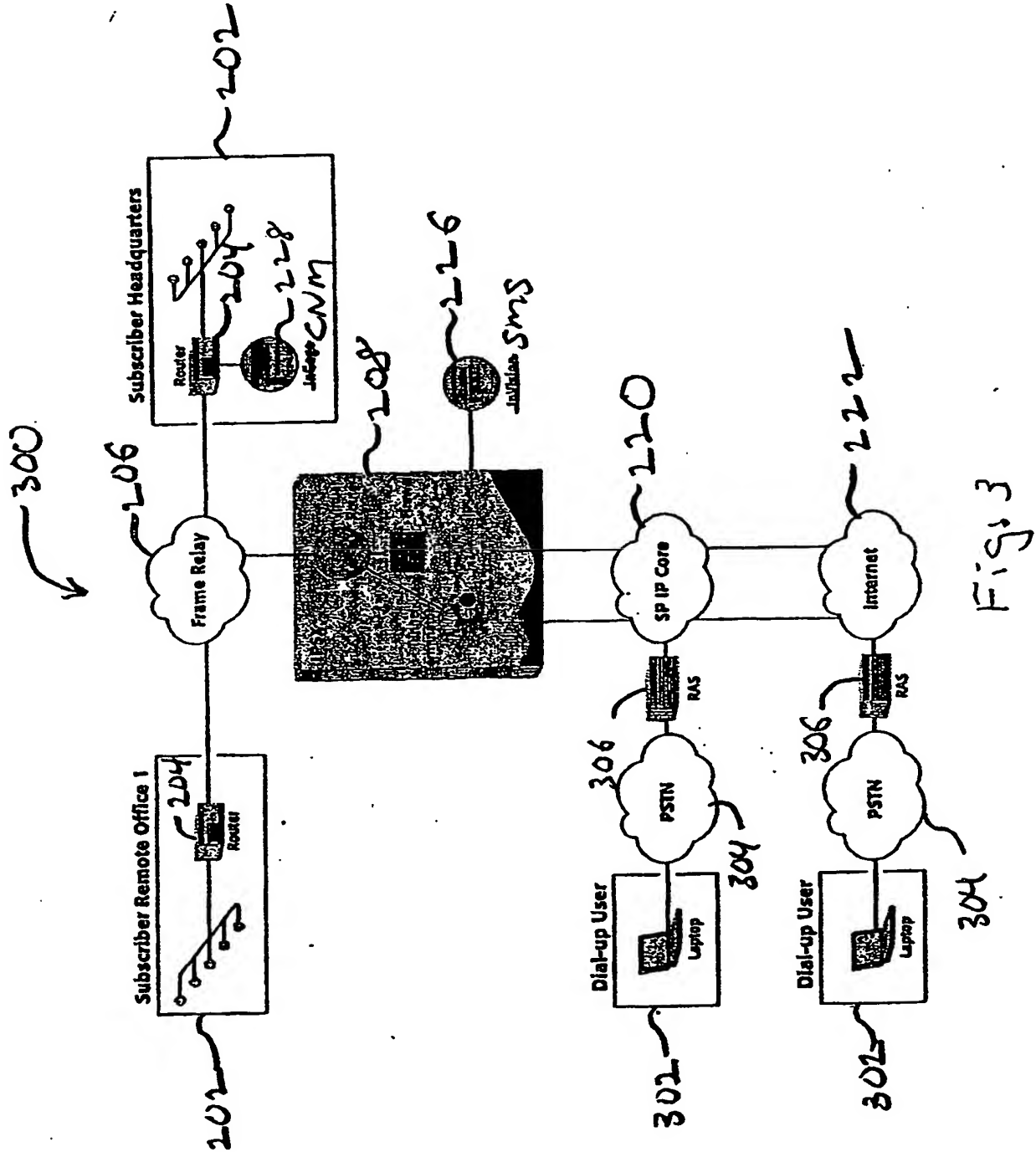


Fig. 3

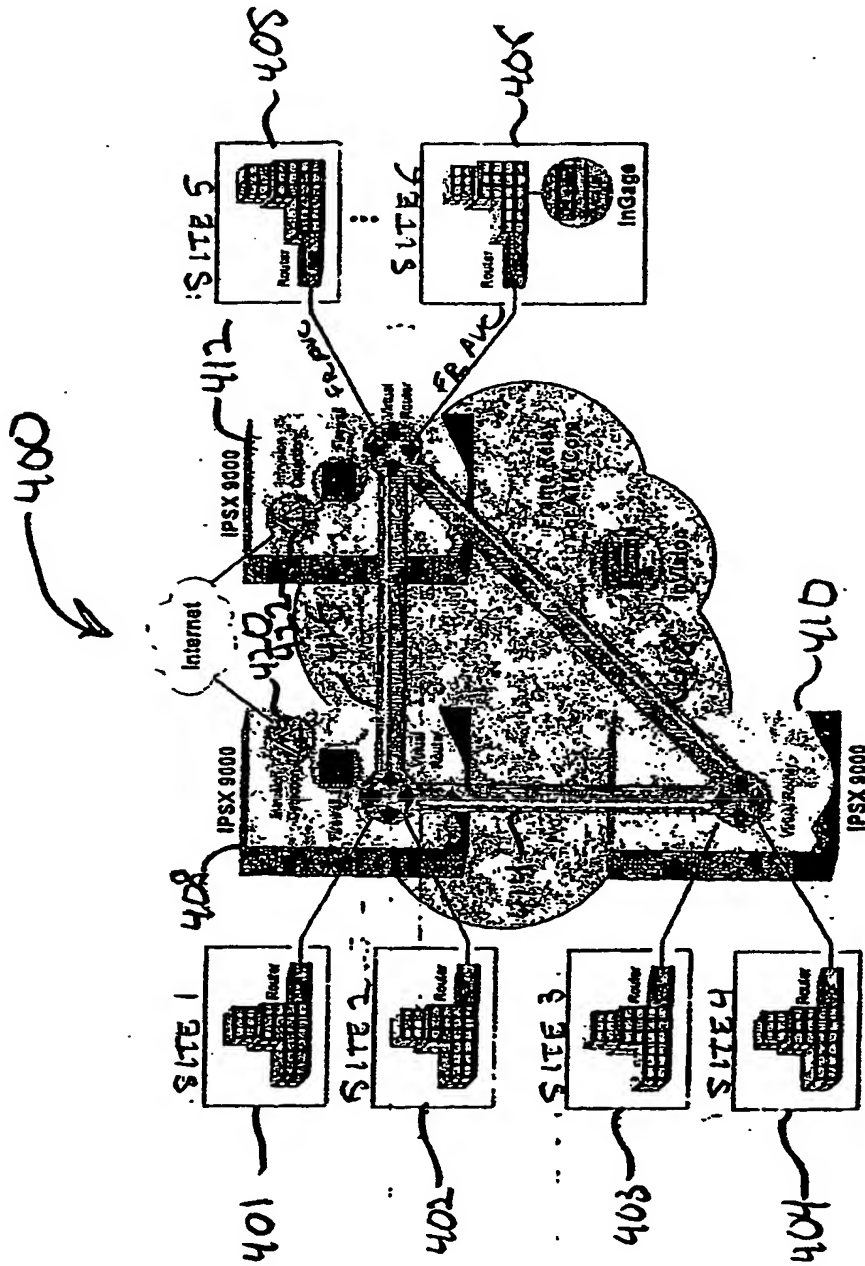


Fig. 4

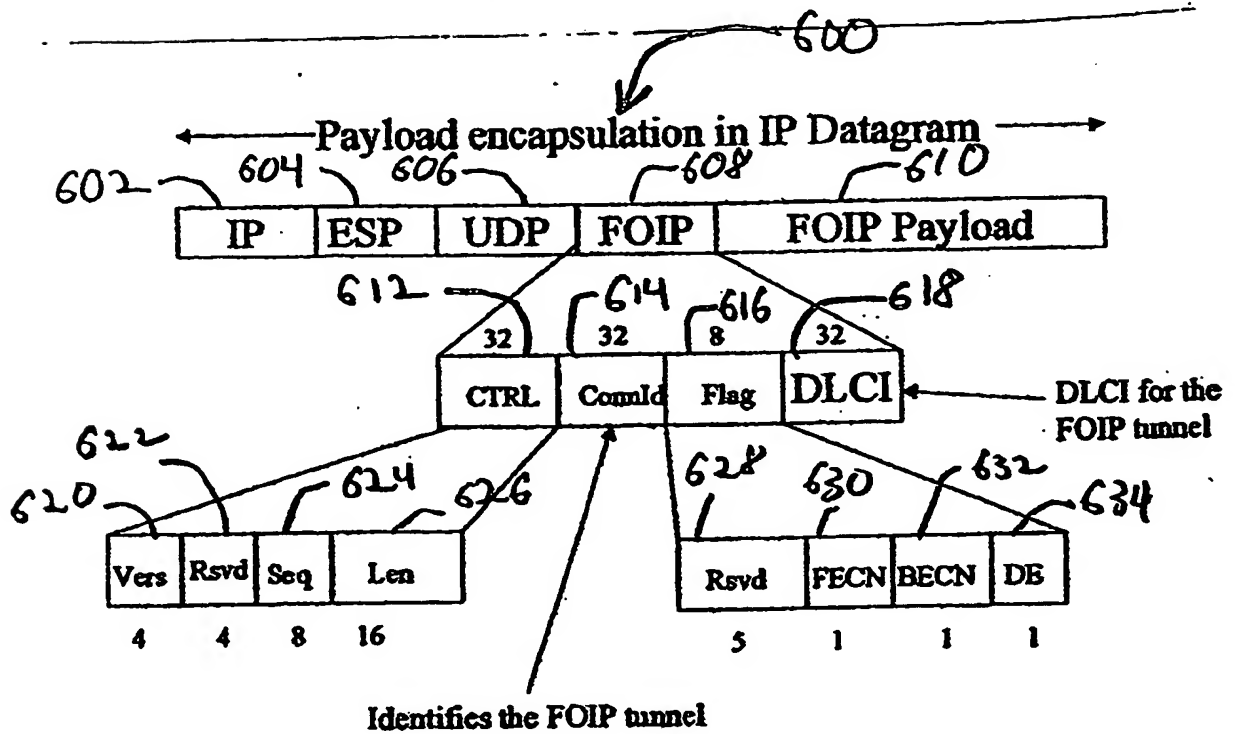
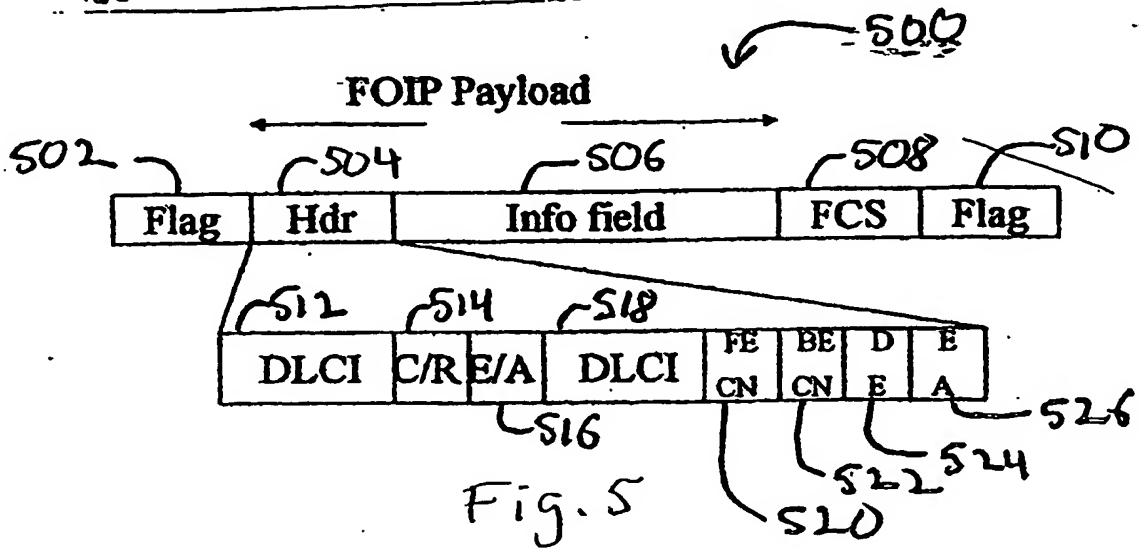
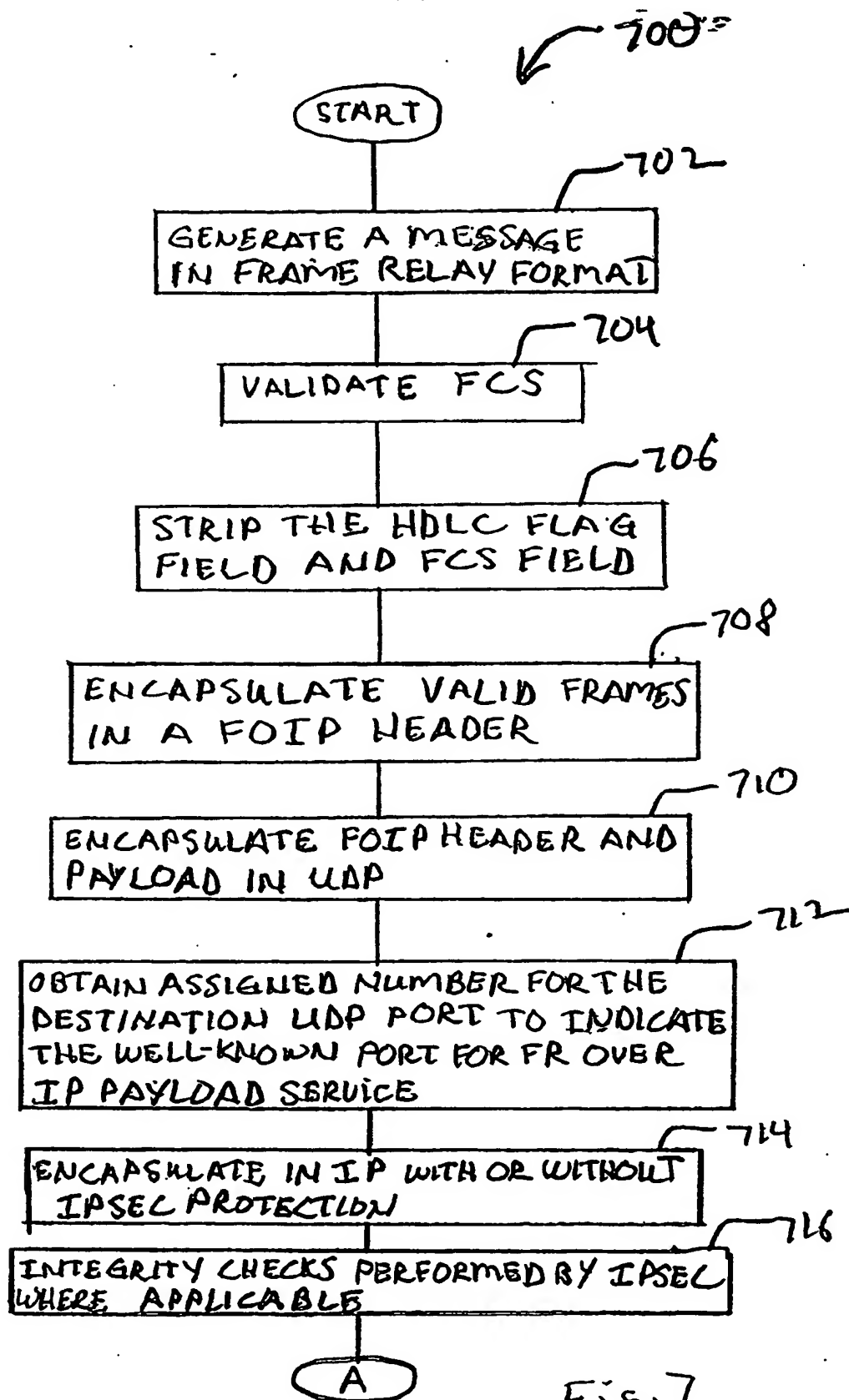


Fig. 6



1384.004 US 1 7/7

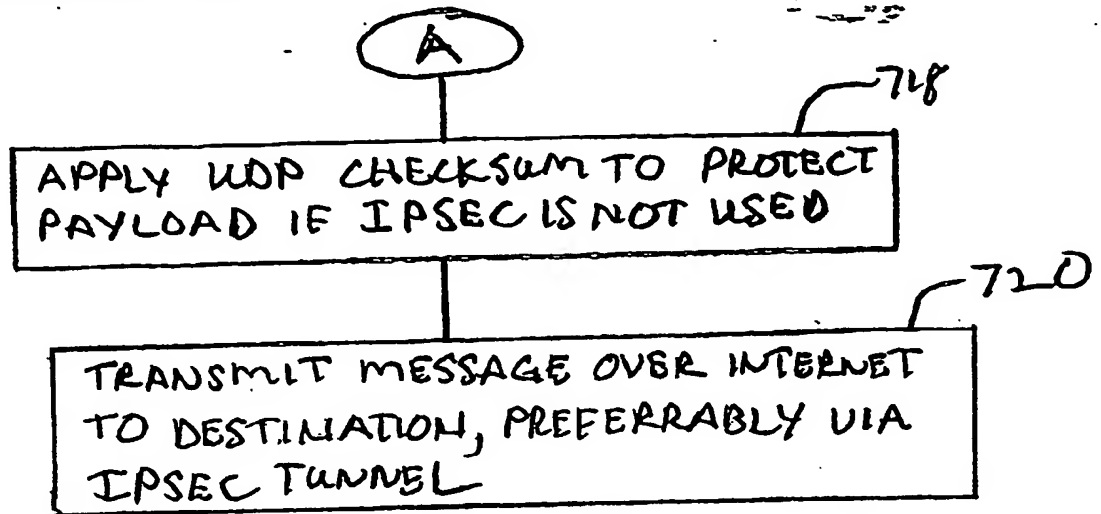


Fig. 7

§ 1.56 Duty to disclose information material to patentability.

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is canceled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is canceled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

- (1) prior art cited in search reports of a foreign patent office in a counterpart application, and
- (2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

- (1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or
- (2) It refutes, or is inconsistent with, a position the applicant takes in:
 - (i) Opposing an argument of unpatentability relied on by the Office, or
 - (ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

- (1) Each inventor named in the application;
- (2) Each attorney or agent who prepares or prosecutes the application; and
- (3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.



SN 10/067106

PATENT

7/6

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Abraham R. Matthews et al.

Examiner: Unknown

Serial No.: 10/067,106

Group Art Unit: 2152

Filed: February 04, 2002

Docket: 1384.004US3

Title: SYSTEM AND PROTOCOL FOR FRAME RELAY SERVICE OVER THE INTERNET

COMMUNICATION RE: DECISION ON PETITION

Mail Stop Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

In response to the "Decision Refusing Status under 37 CFR 1.47(a) " (see enclosed copy), we submit the following to satisfy the requirements:

- 4 pages from <http://fedex.com/us/> confirming the delivery of the signature papers and Application to Sajit Bhaskaran, 1336 Avoset Terrace, Sunnyvale, CA 94087.
- A copy of the signature papers and Application as mentioned above (Including a copy of an email which was sent to Sajit Bhaskaran (sajit@aspen-networks.com) on Wednesday, January 8, 2003).
- A reply, via email, from Sajit Bhaskaran (sajit@aspen-networks.com) explicitly requesting to be removed from the list of inventors.

Applicants assume the application is now in proper order and in condition for examination. Please direct any inquiries to the undersigned attorney at (612) 373-6909.

If necessary, please charge any additional fees or credit overpayment to Deposit Account 19-0743.

Respectfully submitted,
Abraham R. Matthews et al.

By their Representatives,

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
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Minneapolis, MN 55402
(612) 373-6909

Date May 21, 2003

By Thomas F. Brennan
Thomas F. Brennan
Reg. No. 35,075
TFB:CMG:jds

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Attn: Mail Stop Petition, Commissioner for Patents, P.O.Box 1450, Alexandria, VA 22313-1450, on this 21 day of May, 2003

JASON SMITH
Name

[Signature]
Signature

SCHWEGMAN ■ LUNDBERG ■ WOESSNER ■ KLUTH

United States Patent Application

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled: **SYSTEM AND PROTOCOL FOR FRAME RELAY SERVICE OVER THE INTERNET.**

The specification of which was filed on February 4, 2002 as application serial no. 10/067,106.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with 37 C.F.R. § 1.56 (attached hereto). I also acknowledge my duty to disclose all information known to be material to patentability which became available between a filing date of a prior application and the national or PCT international filing date in the event this is a Continuation-In-Part application in accordance with 37 C.F.R. §1.63(e).

I hereby claim foreign priority benefits under 35 U.S.C. §119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on the basis of which priority is claimed:

No such claim for priority is being made at this time.

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below:

No such claim for priority is being made at this time.

I hereby claim the benefit under 35 U.S.C. § 120 or 365(c) of any United States and PCT international application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose material information as defined in 37 C.F.R. § 1.56(a) which became available between the filing date of the prior application and the national or PCT international filing date of this application:

<u>Application Number</u>	<u>Filing Date</u>	<u>Status</u>
09/663,486	September 13, 2000	Closed
09/871,165	May 31, 2001	Pending

I hereby appoint the following attorney(s) and/or patent agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith:

Anglin, J. Michael	Reg. No. 24,916	Haack, John L.	Reg. No. 36,154	Nama, Kash	Reg. No. 44,255
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Bianchi, Timothy E.	Reg. No. 39,610	Jurkovich, Patti J.	Reg. No. 44,813	Padys, Danny J.	Reg. No. 35,635
Billion, Richard E.	Reg. No. 32,836	Kalis, Janal M.	Reg. No. 37,650	Parker, J. Kevin	Reg. No. 33,024
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Clark, Barbara J.	Reg. No. 38,107	Lemaire, Charles A.	Reg. No. 36,198	Prout, William F.	Reg. No. 33,995
Clise, Timothy B.	Reg. No. 40,957	LeMoine, Dana B.	Reg. No. 40,062	Schumm, Sherry W.	Reg. No. 39,422
Cochran, David R.	Reg. No. 46,632	Lundberg, Steven W.	Reg. No. 30,568	Schwegman, Micheal L.	Reg. No. 25,816
Dahl, John M.	Reg. No. 44,639	Maki, Peter C.	Reg. No. 42,832	Speier, Gary J.	Reg. No. 45,458
Drake, Eduardo E.	Reg. No. 40,594	Malen, Peter L.	Reg. No. 44,894	Steffey, Charles E.	Reg. No. 25,179
Embretson, Janet E.	Reg. No. 39,665	Mates, Robert E.	Reg. No. 35,271	Stordal, Leif T.	Reg. No. 46,251
Forrest, Bradley A.	Reg. No. 30,837	McCrackin, Ann M.	Reg. No. 42,858	Terry, Kathleen R.	Reg. No. 31,884
Gamon, Owen J.	Reg. No. 36,143	McGough, Kevin J.	Reg. No. 31,279	Tong, Viet V.	Reg. No. 45,416
Gorrie, Gregory J.	Reg. No. 36,530	McTavish, Hugh E.	Reg. No. 48,341	Viksins, Ann S.	Reg. No. 37,748
Gortych, Joseph E.	Reg. No. 41,791	Mehrle, Joseph P.	Reg. No. 45,535	Woessner, Warren D.	Reg. No. 30,440
Greaves, John N.	Reg. No. 40,362	Muller, Mark V.	Reg. No. 37,509		

I hereby authorize them to act and rely on instructions from and communicate directly with the person/assignee/attorney/firm/organization/who/which first sends/sent this case to them and by whom/which I hereby declare that I have consented after full disclosure to be represented unless/until I instruct Schwegman, Lundberg, Woessner & Kluth, P.A. to the contrary.

Please direct all correspondence in this case to **Schwegman, Lundberg, Woessner & Kluth, P.A.** at the address indicated below:
P.O. Box 2938, Minneapolis, MN 55402
Telephone No. (612)373-6900

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Sajit Bhaskaran

☒ Additional inventors are being named on separately numbered sheets, attached hereto.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Santa Clara, CA 95051

Signature: _____ Date: _____
Sachin Desai

Full Name of inventor:
Citizenship: Residence:
Post Office Address:

Signature: _____ Date: _____

Full Name of inventor:
Citizenship: Residence:
Post Office Address:

Signature: _____ Date: _____

§ 1.56 Duty to disclose information material to patentability.

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SCHWEGMAN ■ LUNDBERG ■ WOESSNER ■ KLUTH

United States Patent Application
COMBINED DECLARATION AND POWER OF ATTORNEY

ORIGINAL

As a below named inventor I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled: **SYSTEM AND PROTOCOL FOR FRAME RELAY SERVICE OVER THE INTERNET.**

The specification of which was filed on February 4, 2002 as application serial no. 10/067,106.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with 37 C.F.R. § 1.56 (attached hereto). I also acknowledge my duty to disclose all information known to be material to patentability which became available between a filing date of a prior application and the national or PCT international filing date in the event this is a Continuation-In-Part application in accordance with 37 C.F.R. §1.63(e).

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Anglin, J. Michael	Reg. No. 24,916	Greaves, John N.	Reg. No. 40,362	Nama, Kash	Reg. No. 44,255
Aronoff, Marvin S.	Reg. No. 35,052	Haack, John L.	Reg. No. 36,154	Nelson, Albin J.	Reg. No. 28,650
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Please direct all correspondence in this case to Schwegman, Lundberg, Woessner & Kluth, P.A. at the address indicated below:

P.O. Box 2938, Minneapolis, MN 55402

Telephone No. (612)373-6900

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Full Name of joint inventor number 1 : Abraham R. Matthews

Citizenship: India

Residence: San Jose, CA

Post Office Address: 933 Willowleaf Drive
Apt. 605
San Jose, CA 95128

Signature: _____

Abraham R. Matthews

Date: _____

May 30, 2002

Full Name of joint inventor number 2 : Sajit Bhaskaran

Citizenship: United States of America

Residence: Sunnyvale, CA

Post Office Address: 1336 Avoset Terrace
Sunnyvale, CA 94087

Signature: _____

Sajit Bhaskaran

Date: _____

X Additional inventors are being named on separately numbered sheets, attached hereto.

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Full Name of joint inventor number 3 : Lianghwa Jou
Citizenship: United States of America Residence: Incline Village, NV
Post Office Address: 1081 Oxen Road
Incline Village, NV 89451

Signature: _____ Date: _____
Lianghwa Jou

Full Name of joint inventor number 4 : Sachin Desai
Citizenship: India Residence: Santa Clara, CA
Post Office Address: 3770 Flora Vista Ave.
#1705
Santa Clara, CA 95051

Signature: S Desai Date: 05/28/2002
Sachin Desai

Full Name of inventor:
Citizenship: Residence:
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Signature: _____ Date: _____

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ORIGINAL

Agency Docket No.1384.004US3

SCHWEGMAN ■ LUNDBERG ■ WOESSNER ■ KLUTH

United States Patent Application

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Citizenship: India

Residence: San Jose, CA

Post Office Address: 933 Willowleaf Drive
Apt. 605
San Jose, CA 95128

Signature: _____

Abraham R. Matthews

Date: _____

Full Name of joint inventor number 2 : Sajit Bhaskaran

Citizenship: United States of America

Residence: Sunnyvale, CA

Post Office Address: 1336 Avoset Terrace
Sunnyvale, CA 94087

Signature: _____

Sajit Bhaskaran

Date: _____

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Full Name of joint inventor number 3 : Lianghwa Jou
Citizenship: United States of America
Post Office Address: 1081 Oxen Road
Incline Village, NV 89451

Residence: Incline Village, NV

Signature: _____

Lianghwa Jou

Date: _____

May 31, 2002

Full Name of joint inventor number 4 : Sachin Desai
Citizenship: India
Post Office Address: 3770 Flora Vista Ave.
#1705
Santa Clara, CA 95051

Residence: Santa Clara, CA

Signature: _____

Sachin Desai

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